MAT 126 Calculus B Spring 2005
Practice Midterm II

Answer each question in the space provided and on the reverse side of the sheets. Show your work whenever possible. Unless otherwise indicated, answers without justification will get little or no partial credit! Cross out anything that grader should ignore and circle or box the final answer. The actual exam will contain 5 problems. This practice test contains more problems to give you more practice.

1. Evaluate the following definite integrals
   (a) \[ \int_{0}^{13} \frac{2}{(2x + 1)^2} \, dx \]
   (b) \[ \int_{0}^{\pi/2} e^{\sin x} \cos x \, dx \]
   (c) \[ \int_{0}^{1} x^4 (1 + x^5)^{20} \, dx \]
   (d) \[ \int_{0}^{1} \tan^{-1} x \, dx \]
   (e) \[ \int_{0}^{\pi/2} \cos^5 t \, dt \]

2. Evaluate the following indefinite integrals
   (a) \[ \int x^3 e^{x^4} \, dx \]
   (b) \[ \int te^t \, dt \]
   (c) \[ \int x^2 \cos x \, dx \]
   (d) \[ \int \cos(\sqrt{x}) \, dx \]

3. Evaluate the following indefinite integrals
(a) \[ \int \frac{1}{x^2} \ln x \, dx \]

(b) \[ \int \frac{1}{x} (\ln x)^2 \, dx \]

4. Evaluate the following indefinite integrals
(a) \[ \int \frac{2x^2}{x^2 + 1} \, dx \]
(b) \[ \int \frac{2}{x^2 - 1} \, dx \]
(c) \[ \int \frac{2x}{x^2 + 1} \, dx \]

5. (a) Write a formula for \( \tan x \) in terms of \( \sin x \) and \( \cos x \).
(b) Evaluate \[ \int \tan x \, dx \]

6. Evaluate \[ \int \sqrt{16 - x^2} \, dx \]

7. (a) Set \[ f(x) = \int_1^x \sin t^3 \, dt \]
Find \( f(1) \) and \( f'(x) \).
(b) Set \[ f(x) = \int_{\sqrt{x}}^{x^2} \tan^2 t \, dt \]
Find \( f(4) \) and \( f'(x) \).